

Intermountain Power  
Variable Frequency Drive (VFD) Systems (LCI)  
Technical Questions of 9/19/2003 on GE Quotation DSP090832

Item	Question	GE Response
1.	Provide reference list	Done
2.	Detailed installation sequence.	See attached – Installation.doc and Layout documents.
3.	Supplied piping	None but new Water/water exchangers can be installed on top of drive cabinets.
4.	Bearing Wear?	Bearing wear not an issue for LCI drives.
5.	Wiring Diagrams and drawing format?	Done.
6.	Independent labeling?	Can be CSA labeled.
7.	Outline drawings.	We will supply both paper and AutoCad format.
8.	Head on water system?	26 feet but not as applicable for new proposal with water to water heat exchangers.
9.	Drive meet IEEE 519?	Proposed drive will be 12 pulse for each motor but if new transformers are purchased, the new primaries will be shifted 7.5 degrees and the combination of 2 motors will look somewhat like 24 pulse to the power system.
10	Shipping split? Installation plan?	Drive pump panel will be shipped separately. See Installation.doc attached.
11	Cost savings of 8500HP?	New rev.1 of proposal.
12	Where is exciter?	Exciter located in LCI control cabinet.
13	LCI vs PWM efficiency?	Synch motor is more efficient than induction but if both drives use synch motor then this issue goes away. The loss in an LCI, which has thyristor (SCR) switches, is generally lower than a PWM drive because the SCR's are inherently lower loss than IGBT's and because the effective switching frequency of the LCI is lower than the PWM drive. The LCI also has fewer switching devices. An LCI does have a link reactor that has loss, but the loss in the reactor is controllable by lowering the resistance of the reactor. The combined efficiency of the transformer, LCI drive converter, and reactor can be as high as 97.5% (not including the motor) with properly selected components.
14	Interface to existing plant controls?	No modification to existing plant controls will be required.
15	Drive weight?	LCI drive weight approx. 7400 lb.
16	Seismic requirements?	LCI drive will be provided with PE stamp for seismic zone.
17	Can cooling systems come early?	Drive heat exchanger can be shipped to site early.

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18	Cooling system details.	See Water cooling document.
19	Control interfaces accounted for?	Yes
20	Terminal block type?	We can provide the Marathon 200 or States type terminals for customer connections.
21	Any PVC used?	Only wire trays and a few very small ribbon cables.
22	PC software included?	GE Toolbox software package included with the drive and can be installed and run on multiple customer computers. PC's deleted from proposal rev. 1 per customer request.
23	20% spare terminals?	Yes
24	System manuals Viatch?	Yes.